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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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7590

04/14/2006

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT

PAPER NUMBER

3745

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/813,131	Applicant(s) ZHANG ET AL.	
	Examiner Christopher Verdier	Art Unit 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 5-18-04, 1-24-06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Applicant's amendment dated January 24, 2006 has been carefully considered but is non-persuasive. Claims 1-13 are pending. The Replacement Sheet of drawings filed January 24, 2006 overcomes the drawing objections set forth in the previous Office action. The specification has been amended to correct the informalities set forth in the previous Office action. The specification has been amended to provide antecedent basis for the claimed subject matter of claims 2-3 and 8, as set forth in the previous Office action. However, the specification lacks antecedent basis for the newly amended claims as set forth later below. Applicant has adopted the examiner's suggested claim language, and have amended claim 13 to overcome the informality therein as set forth in the previous Office action. With regard to claim 1, claim 1 still contains the informality set forth in the previous Office action. The claims have been amended to overcome the rejections under 35 USC 112, second paragraph as set forth in the previous Office action. Correction of these matters is appreciated.

Applicant has amended the independent claims 1, 10, and 13 to recite that the film cooling holes have a concentric counter-bore at the exit, with each hole and counter-bore being parallel and connected by a substantially 90 degree shoulder, and has argued that the claims define over Gupta 5,771,577, as well as the combination of Gupta and Japanese Patent 60-32,903. Applicant is correct that neither of these references discloses these features, however Kercher 3,542,486 teaches this film cooling hole configuration for the reasons set forth below. Note that Gupta (figures 3A and 3B) and column 6, lines 2-15 teaches that the counter-bore 18 may be of various shapes and need not be circular, so long as the relationships of the invention of Gupta are maintained. Because of this teaching in the primary reference to Gupta and the

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disclosure of Kercher 3,542,486 that film cooling holes may have a concentric counter-bore at the exit, with each hole and counter-bore being parallel and connected by a substantially 90 degree shoulder, the claims are unpatentable under 35 USC 103(a) as being obvious over Gupta in view of Kercher.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 1, lines 4-5; claim 10, lines 4-5; and claim 13, lines 5-6 each recite that the hole and counter-bore are connected by a substantially 90 degree shoulder. There is no antecedent basis in the specification for the underlined term.

Claim Objections

Claims 1-13 are objected to because of the following informalities: Appropriate correction is required.

In claim 1, line 2, -- each -- should be inserted after “holes”.

In claim 1, line 4, “depth each,” should be changed to -- depth, each --.

In claim 10, line 3, -- is -- should be inserted after “thereof”.

In claim 10, line 4, “depth each,” should be changed to -- depth, each --.

In claim 13, line 5, -- , -- should be inserted after “hole” (first occurrence).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4-6, 7, and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 in view of Kercher 3,542,486. Gupta (figures 3A and 3B) discloses a turbine component 10 substantially as claimed, with the turbine component 10 having a plurality of film-cooling holes 12 formed in a region of the component to be cooled, the cooling holes having a specified diameter 14, each hole at an exit thereof formed with a counter-bore 18 of predetermined depth, the component having a coating 22 applied thereto at least in the region, wherein the counter-bore provides an area for excess coating material to accumulate without reducing the specified diameter. The specified diameter is in the range of about 0.01 to 0.04

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inch, and the counter-bore diameter is about 0.02 to 0.10 inch. The coating comprises a first bondcoat layer and a second thermal barrier coating layer, with the bondcoat layer being Ni-Al based material and the thermal barrier coating being yttria stabilized zirconium material. Also disclosed is a method of maintaining cooling efficiency of the film-cooling holes in the turbine component, where the film-cooling holes have specified diameters 14 and the turbine component has the protective coating thereon, comprising a) before coating, forming each film-cooling hole with the counter-bore at an exit end of the film-cooling hole; and b) spraying the coating onto the turbine component at least in areas surrounding the film-cooling holes such that excess coating material accumulates in the counter-bore without reducing the specified diameters of the cooling holes. See column 2, lines 11-25, column 4, lines 60-67, column 5, lines 1-7, column 5, lines 18-39, and column 6, lines 1-7.

However, Gupta does not disclose that each hole at the exit end is formed with a concentric counter-bore, each hole and respective counter-bore being parallel and connected by a substantially 90 degree shoulder (claims 1, 10 and 13). Gupta also does not disclose that the gas turbine bucket has a shank portion (claim 10).

Kercher (figures 2-3 and 5) shows a cooled turbine blade/bucket 24 having film cooling holes 62 formed such that each hole at the exit end is formed with a concentric counter-bore 64, each hole and respective counter-bore being parallel and connected by a substantially 90 degree shoulder (column 3, lines 59-72), for the purpose of providing a diffusion section effective to

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reduce the efflux velocity of cooling fluid to a desired level. Kercher also shows that the gas turbine bucket has a shank portion 44, for the purpose of securing the bucket to a rotor.

Column 6, lines 2-15 of Gupta teaches that the counter-bore 18 may be of various shapes and need not be circular, so long as the relationships of the invention of Gupta are maintained. In view of this statement, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the film cooling holes 12 of Gupta in figures 3A or 3b such that each hole at the exit end is formed with a concentric counter-bore, each hole and respective counter-bore being parallel and connected by a substantially 90 degree shoulder, as taught by Kercher, for the purpose of providing a diffusion section effective to reduce the efflux velocity of cooling fluid to a desired level. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine blade/bucket of Gupta such that it has a shank portion, as taught by Kercher, for the purpose of securing the bucket to a rotor.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 and Kercher 3,542,486 as applied to claim 2 above, and further in view of Fric 6,383,602. The modified turbine component of Gupta shows all of the claimed subject matter except for the counter-bore depth being about 0.030 inch.

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Fric (figures 5-8 and column 5, lines 35-48) teaches that film-cooled turbine components 40 may have cooling passages 46 with a counter-bore 51, 56 at the exit of the passages having a depth of about 0.030 inch, for the purpose of providing increased cooling effectiveness.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the depth of the counter-bore in the modified turbine component of Gupta such that it is about 0.030 inches, as taught by Fric, for the purpose of providing increased cooling effectiveness.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta 5,771,577 and Kercher 3,542,486 as applied to claim 7 above, and further in view of Fric 6,383,602. The modified turbine component/gas turbine bucket of Gupta shows all of the claimed subject matter, except for the counter-bore depth being about 0.030 inch.

Fric (figures 5-8 and column 5, lines 35-48) teaches that film-cooled turbine components 40 may have cooling passages 46 with a counter-bore 51, 56 at the exit of the passages having a depth of about 0.030 inch, for the purpose of providing increased cooling effectiveness.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the depth of the counter-bore in the modified turbine component/gas turbine bucket of Gupta such that it is about 0.030 inches, as taught by Fric, for the purpose of providing increased cooling effectiveness.

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

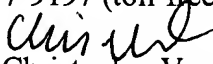
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
April 6, 2006


Christopher Verdier
Primary Examiner
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